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QUARTERLY REPORT

October 2, 1979

APPLICATIONS OF HCMM DATA

TO

SOIL MOISTURE SNOW

AND

ESTUARINE CURRENT STUDIES

Original photography may be purchased from:
EROS Data Center

Sioux Falls, SD 57198

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NOAA/NESS/ESG
World Weather Building
Room 810
Washington, D.C. 20233
(301) 763-8036

Identification Number - HCM-045

[redacted]

HCMM 045
TYPE II

A. Problems

Though the 6-week mid-summer drought of imagery is now over, imagery currently being received is generally over one year old. No tapes have been received since the last quarter, one still remains on order. In our view the most vexing problem is the inability of the HCMM processing system to react in a timely fashion to user demands. In particular, the HCMM data (night/day) passes collected during our Luverne, Minnesota, field experiment (6/13/79) have yet to be seen, even in imagery form. NASA/JSC has a similar problem in processing data. Promises of one-to-two months delivery of aircraft data made to Ralph Peterson by JSC have not been kept. In the absence of satellite and aircraft data, progress is best described as "glacial."

B. Accomplishments

Satisfactory progress continues on merging the data collection system (LaBarge, Inc.) with the RSG½ soil moisture/snow water equivalent gauge. Completion of final testing is expected by October 5, with field installation at the Luverne test site during the week of Ocbober 15-19. Personnel from NESS, USGS (Huron, S.D.), USDA (Luverne), and Idaho Industrial Industries, Inc., will be present to assist in the installation.

Additional analyses of Luverne 6/13/79 ground data revealed that soil moisture variations are independent of elevation effects. Further analyses of the 6/13/79 field survey are pending receipt of HCMM and aircraft data.

At the request of Mr. Alden Colvocoresses, Cartographic Coordinator, EROS Program (USGS), a detailed thermal map of Lake Anna (located near Gordonsville, Va.) was prepared from CCT's by Mr. John Pritchard of NESS.

The nighttime (near 0300 local daylight time) analysis for the June 11, 1978 pass produced a 1:250,000-scale printout with temperatures calculated to 0.1°C (see Figure 1). An algorithm developed by John Price was used to obtain temperatures based on preflight calibration.

Using the same CCT, tidal fluctuations in the Potomac River and Delaware Bay were examined as a function of surface temperature. Preliminary findings suggest that temperature boundaries are sufficient to detect various stages of the tidal cycle in Delaware Bay, but are as yet uncertain for prediction in the Potomac River. At least 3 additional cases are needed to completely evaluate the tidal cycle (see Figure 2).

An alpha-numeric printout at a scale of 1:1,000,000 compares closely with a 1:1,000,000-scale DMD enhanced image of the Chesapeake Bay region (see Figures 3 and 4). Both products are the result of computer programs developed by John Pritchard.

Landsat images have been received for the Cooper River estuary and will be used as a base map for the study of tidal circulation patterns.

C. Significant Results

See tidal fluctuations in Delaware Bay found in Section B. Accomplishments.

D. Publications

None.

E. Recommendations

Processing of CCT's and priority requests need to be expedited.

F. Funds Expended to Date

Balance of Funds	4.6K
Spent this period	0.0
Funds remaining	4.6K

G. Data Utility

Imagery still continues to be limited in dynamic range of grey scale whenever bright clouds are visible (visible only). Many images contain noise, i.e., banding, striping, etc. Another CCT has been ordered.

H. Future Plans

Our major effort continues to be the 6/13/79 Luverne data set. Hopefully satellite and aircraft data will become available before the end of the year. Smaller studies will entail examining the tidal fluctuation in Delaware Bay and the Potomac River and Cooper River estuaries.

FOLDOUT FRAME /

STARTING SPOT 901HCMM NIGHT-TIME INFRARED JUNE 11, 1978 TEMPERATURE IN DEGREES CELSIUS TIMES 10 STARTING SPOT 926HCMM NIGHT

64	64	72	79	76	72	76	72	76	83	83	83	76	87	83	79	76	76	68	76	79	83	76	76	79	83	83	76	79	76	76	79
65	65	72	79	83	83	90	76	87	97	112	105	90	87	83	83	83	83	79	79	[illegible]	83	76	79	79	79	83	83	79	72	72	79
68	68	72	72	72	83	79	76	83	87	119	122	108	94	83	76	79	79	79	79	[illegible]	79	76	76	83	76	79	87	79	72	68	64
72	65	72	76	72	72	79	79	87	79	79	97	119	108	90	83	76	87	83	83	83	76	76	79	87	83	76	83	83	76	76	68
72	64	68	79	79	72	83	87	87	87	87	90	105	119	112	94	90	94	87	97	[illegible]	87	83	83	79	76	76	83	83	76	72	76
79	76	76	79	87	79	90	90	101	108	105	90	90	108	122	122	112	94	90	101	[illegible]	121	83	83	79	79	79	87	83	72	72	76
79	79	83	83	83	90	101	108	122	129	122	103	105	103	115	122	115	108	101	101	115	112	87	83	76	76	79	90	79	76	79	79
76	76	79	83	87	94	122	126	112	105	101	112	112	108	108	112	119	119	112	112	[illegible]	129	115	94	87	83	83	87	83	83	87	90
79	76	83	87	83	87	101	97	83	79	87	87	83	87	87	94	90	94	[illegible]	[illegible]	[illegible]	[illegible]	126	129	105	94	87	83	83	90	90	97
76	72	83	87	83	87	76	76	83	90	90	87	87	90	87	90	87	87	87	[illegible]	[illegible]	[illegible]	115	147	129	101	83	83	87	90	108	108
79	83	87	87	83	87	76	83	87	83	87	90	83	90	87	94	90	87	90	87	[illegible]	87	101	129	136	129	103	94	87	90	108	115
79	87	87	90	90	97	83	83	94	101	105	101	94	87	105	101	105	97	90	[illegible]	[illegible]	[illegible]	90	97	129	147	122	97	90	97	112	103
83	97	108	115	112	115	112	115	122	129	126	122	119	108	129	129	119	115	115	115	[illegible]	119	119	115	133	133	126	115	105	112	129	105
90	101	122	122	108	119	136	133	129	122	105	112	122	122	119	119	108	112	119	122	[illegible]	[illegible]	147	147	133	119	133	133	126	133	133	105
79	87	94	87	90	105	101	94	97	105	94	90	94	97	94	101	94	90	97	[illegible]	[illegible]	[illegible]	119	112	105	94	101	105	136	150	133	105
79	79	83	90	97	90	83	83	90	94	87	94	90	94	90	101	94	90	90	[illegible]	[illegible]	[illegible]	94	83	90	94	87	94	115	140	150	126
83	83	87	90	90	87	87	83	83	94	90	90	94	94	94	97	90	90	90	90	[illegible]	87	90	90	90	90	87	94	105	126	136	140
83	83	83	79	87	90	83	83	79	90	90	83	90	83	87	90	94	90	90	95	[illegible]	[illegible]	87	90	90	83	90	90	94	105	119	122
83	87	79	83	87	87	87	83	87	90	87	87	90	87	87	87	87	87	90	90	[illegible]	87	79	83	79	87	90	90	94	105	119	101
83	83	79	83	87	87	87	87	90	87	90	90	94	90	87	90	87	87	90	87	[illegible]	[illegible]	76	79	79	83	87	94	119	126	108	90
87	83	79	79	87	87	83	83	90	87	90	90	87	90	90	87	87	83	83	[illegible]	[illegible]	[illegible]	79	79	87	90	97	108	126	115	94	90
83	79	79	83	90	87	79	83	83	90	87	90	87	90	90	87	94	87	83	87	[illegible]	[illegible]	83	90	105	112	129	136	115	90	87	90
76	83	79	87	87	87	83	87	83	87	87	87	90	87	87	87	94	83	83	83	[illegible]	83	83	87	94	101	115	126	101	87	90	83
79	83	87	87	83	87	79	79	87	83	83	87	87	90	83	87	87	83	87	87	[illegible]	79	87	79	83	87	97	97	90	83	87	83
76	79	79	83	83	79	83	83	79	79	79	83	87	87	83	87	87	87	83	87	[illegible]	87	83	83	[illegible]	83	87	90	79	87	83	90
76	79	79	83	87	83	79	83	76	79	83	79	87	83	87	87	83	83	83	87	[illegible]	87	79	83	[illegible]	76	76	83	83	83	83	83
76	83	79	79	87	83	79	83	76	79	83	83	90	83	87	83	79	87	87	87	[illegible]	87	83	83	[illegible]	76	83	87	83	79	79	76
76	79	83	83	87	79	83	79	72	83	87	90	90	87	90	83	87	87	90	87	[illegible]	87	90	83	[illegible]	83	87	90	83	83	79	72
76	83	83	83	79	83	79	72	72	79	76	83	87	87	83	83	83	87	90	90	[illegible]	83	83	79	[illegible]	83	87	83	83	79	76	68
[illegible]	83	83	83	79	76	72	72	72	72	72	76	83	79	79	76	79	83	87	[illegible]	83	79	83	79	[illegible]	83	87	76	72	76	68	68
[illegible]	83	83	87	83	76	79	76	76	72	72	79	83	83	83	83	87	87	87	83	83	83	83	87	[illegible]	87	79	79	79	76	76	76
79	79	79	79	79	83	79	72	68	68	72	79	79	79	79	83	83	83	90	90	83	79	83	83	[illegible]	83	76	72	76	83	79	83
76	79	72	72	79	79	76	68	68	68	68	76	79	79	76	83	79	79	79	79	83	79	76	87	[illegible]	76	72	68	72	76	79	83
79	76	79	72	76	79	83	79	76	72	72	72	72	79	79	83	79	83	83	79	83	83	83	87	[illegible]	83	76	72	79	79	79	79
76	76	79	72	68	76	79	79	72	68	68	61	76	76	83	83	83	83	87	90	83	83	87	87	[illegible]	79	79	76	79	79	79	79
72	76	79	72	72	72	79	72	68	68	64	57	76	72	72	79	83	83	90	87	79	87	87	83	[illegible]	79	79	79	79	79	83	87
79	83	79	76	76	76	76	72	64	68	64	64	72	72	68	79	87	87	87	83	79	87	87	83	83	79	76	79	76	76	79	87
76	87	83	76	79	76	79	76	68	64	64	[illegible]	72	68	72	79	87	87	87	83	87	83	87	87	83	79	76	76	79	83	83	87
63	72	83	83	83	83	87	83	72	68	61	61	61	64	76	83	83	83	87	87	83	87	79	83	76	79	79	79	79	83	83	87
64	63	76	79	79	79	79	76	68	61	57	53	61	64	72	79	76	79	[illegible]	[illegible]	83	83	83	76	72	76	83	76	76	76	76	79

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

ORIGINAL PAGE IS OF POOR QUALITY

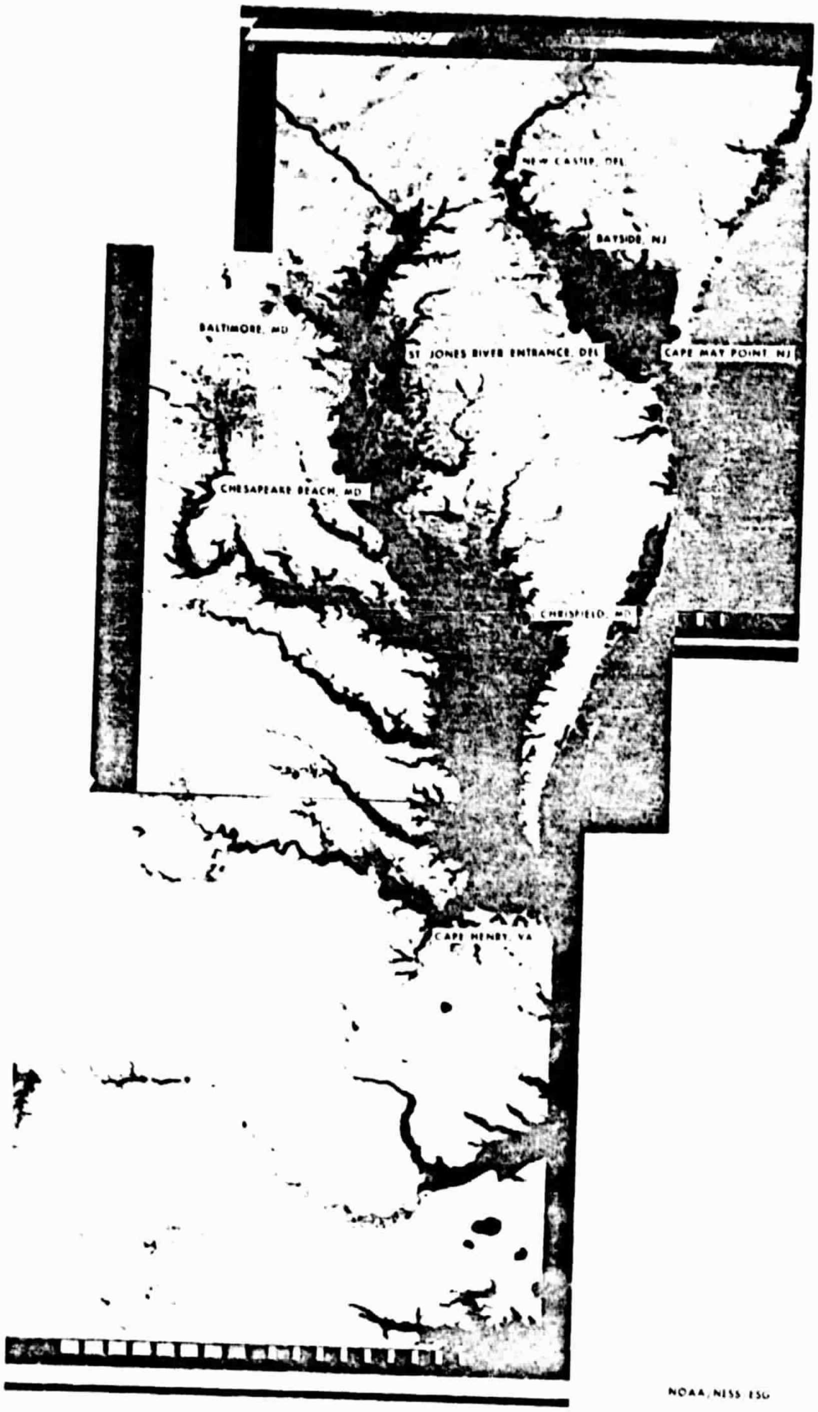
e.g. 83 = 8.3°C FOLDOUT FRAME 2

TIMES 10 STARTING SPOT 926HCMM NIGHT-TIME INFRARED JUNE 11, 1978 TEMPERATURE IN DEGREES CELSIUS TIMES 10 STARTING SPC

76	79	83	83	76	79	76	76	79	79	87	83	79	79	72	68	68	68	76	83	79	83	83	83	83	72	79	72	76	79
79	79	79	83	83	79	72	72	79	83	83	87	83	83	79	72	72	79	79	79	83	83	83	79	79	76	79	87	72	76
76	83	76	79	87	79	72	68	64	87	83	87	83	83	83	76	79	83	83	76	79	83	79	83	76	72	68	72	68	72
79	87	83	76	83	83	76	76	68	83	87	83	83	83	90	87	87	83	87	83	83	83	83	87	83	76	76	76	72	72
83	79	76	76	83	83	76	72	76	79	87	83	83	87	90	90	83	79	83	83	79	76	76	79	83	76	79	83	76	72
83	79	79	79	87	83	72	72	76	79	79	90	90	90	94	94	83	79	76	79	76	76	76	72	79	76	72	76	76	76
83	76	76	79	90	79	76	79	79	83	83	83	87	90	90	94	90	90	79	83	79	79	76	72	72	72	72	76	72	72
94	87	83	83	87	83	83	87	90	87	87	83	90	94	83	90	94	94	87	83	83	79	72	72	68	76	76	76	79	79
129	105	94	87	83	83	90	90	97	87	[illegible]	87	90	90	87	94	94	94	90	83	83	79	79	72	76	76	79	83	76	76
147	129	101	83	83	87	90	108	108	90	87	87	87	94	94	90	90	90	90	90	83	83	79	72	76	83	79	87	83	76
129	136	129	105	94	87	90	108	115	94	87	90	87	94	94	94	94	94	94	94	94	83	79	79	76	79	83	83	79	83
97	129	147	122	97	90	97	112	108	94	94	87	90	94	90	97	94	94	94	94	101	87	87	83	83	79	79	79	83	79
115	133	133	126	115	105	112	129	105	90	94	87	90	94	97	94	90	94	97	94	94	83	79	79	72	72	72	76	72	68
147	133	119	133	133	126	133	133	105	94	90	94	101	105	108	87	90	90	90	97	87	87	87	79	68	72	68	68	72	64
112	105	94	101	105	136	150	133	105	94	87	94	108	112	97	87	87	90	90	94	94	90	90	76	68	64	68	64	68	64
83	90	94	87	94	115	140	150	126	97	97	97	108	119	94	87	90	94	94	94	94	97	90	79	68	68	61	64	61	61
90	90	90	87	94	105	126	136	140	119	122	122	133	126	101	90	94	90	87	94	94	94	94	83	72	68	61	57	57	64
90	90	83	90	90	94	105	119	122	115	112	129	147	136	115	97	105	112	97	94	94	94	90	87	79	72	64	61	64	64
83	79	87	90	90	94	105	119	101	90	83	112	133	143	136	129	133	140	122	101	97	94	90	94	87	87	72	68	68	64
79	79	83	87	94	119	126	108	90	87	83	101	119	133	140	147	150	140	119	105	112	112	112	97	90	94	83	76	68	64
79	87	90	97	108	126	115	94	90	87	87	94	101	108	112	129	143	140	122	115	129	140	133	112	94	90	83	79	76	68
90	105	112	129	136	115	90	87	90	87	90	90	97	101	108	126	143	143	140	140	143	143	129	115	105	83	83	79	79	68
87	94	101	115	126	101	87	90	83	83	87	87	97	101	126	150	150	129	136	143	143	140	133	129	115	94	87	87	83	72
79	83	87	97	97	90	83	87	83	83	83	87	94	105	112	122	129	115	126	129	126	136	143	143	133	115	108	101	90	79
83	[illegible]	83	87	90	79	87	83	90	87	79	87	90	94	94	97	105	108	108	105	108	133	140	143	143	136	133	108	87	76
83	[illegible]	76	76	83	83	83	83	83	79	79	87	97	105	94	105	133	140	133	122	105	122	136	140	143	143	133	105	87	90
83	[illegible]	76	83	87	83	79	79	76	76	87	105	126	129	136	140	154	150	150	150	133	126	136	140	147	140	133	129	126	119
83	[illegible]	83	87	90	83	83	79	72	83	105	122	115	108	129	143	122	112	129	157	157	136	143	140	140	136	140	147	143	119
79	[illegible]	83	87	83	83	79	76	68	79	105	119	105	83	94	97	105	129	140	140	133	115	136	115	108	119	133	143	136	105
79	[illegible]	83	87	76	72	76	68	68	76	97	115	108	90	90	90	112	129	122	105	126	150	122	94	105	126	136	133	129	101
87	[illegible]	87	79	79	79	76	76	76	87	108	112	97	94	101	126	136	108	94	101	126	129	108	108	129	150	140	115	97	90
83	[illegible]	83	76	72	76	83	79	83	97	108	105	94	94	112	136	115	97	94	108	126	115	97	115	140	157	136	97	87	83
87	[illegible]	76	72	68	72	76	79	83	83	90	94	90	94	115	129	101	87	87	101	112	101	97	122	143	133	119	94	87	76
87	[illegible]	83	76	72	79	79	79	79	83	87	87	83	101	105	115	97	87	87	87	94	101	119	136	143	101	90	87	83	76
87	87	79	79	76	79	79	79	79	87	83	90	87	87	101	101	90	87	83	83	101	126	129	122	115	90	79	87	79	76
83	[illegible]	79	79	79	79	79	83	87	83	79	87	83	87	87	90	83	87	87	90	105	115	119	105	90	90	83	87	83	79
83	83	79	76	79	76	76	79	87	79	83	83	83	87	83	83	83	83	83	90	105	97	101	97	87	87	87	87	87	83
87	83	79	76	76	79	83	83	87	83	87	87	83	79	83	83	87	83	83	87	90	87	87	87	87	87	87	87	87	83
83	76	79	79	79	79	83	83	87	87	87	83	87	79	83	83	87	87	87	87	[illegible]	[illegible]	79	87	87	83	83	87	87	83
76	72	76	83	76	76	76	76	79	76	76	72	76	83	83	76	79	79	83	83	[illegible]	[illegible]	76	83	87	87	83	83	83	79

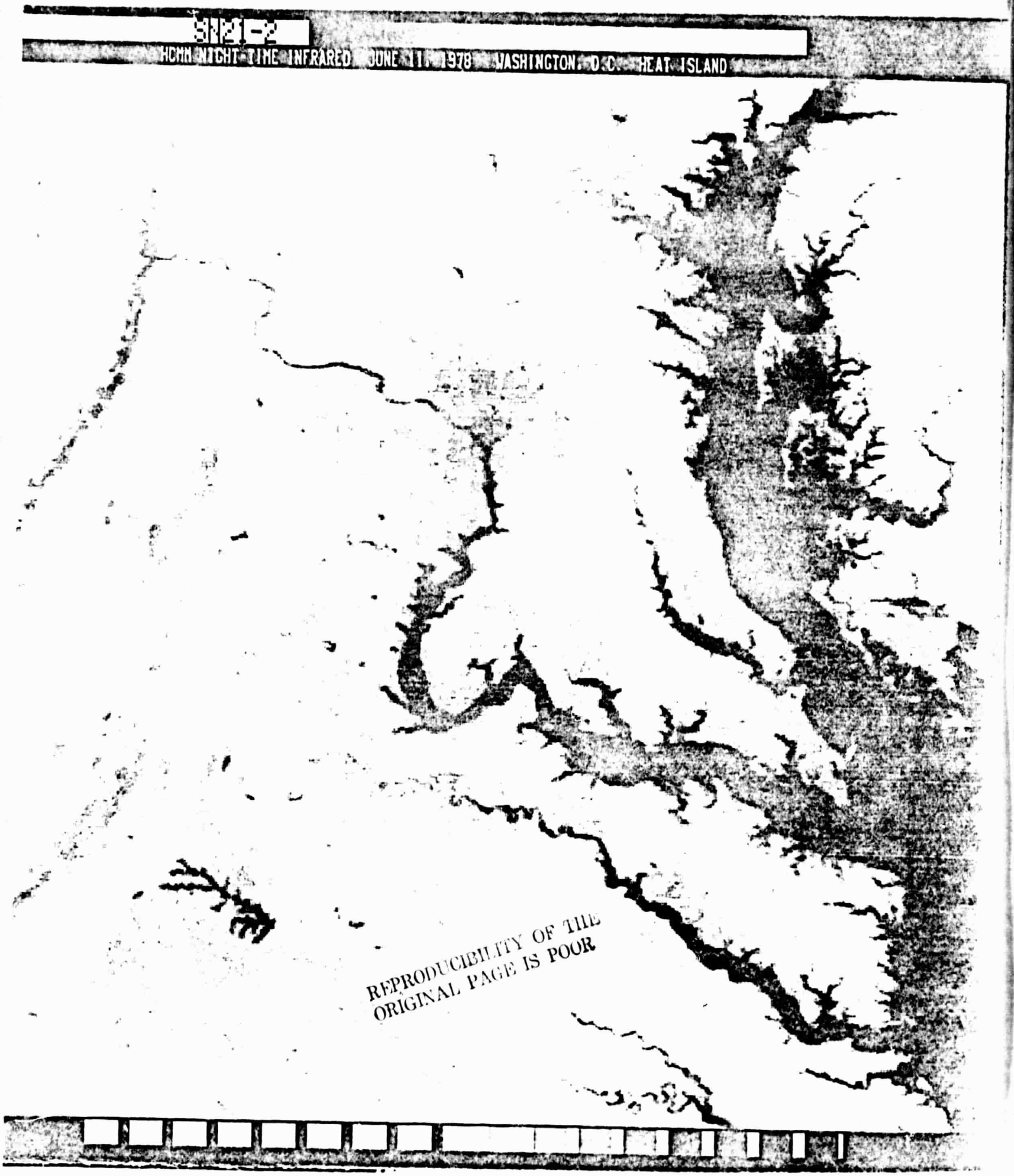
FOLDOUT FRAME

Lake Anna



HCMM SATELLITE THERMAL MOSAIC
OF DELAWARE AND CHESAPEAKE BAYS
JUNE 11, 1978

SCALE 1:1 000 000


HCMM NIGHT-TIME INFRARED JUNE 11, 1978 WASHINGTON, D.C. HEAT ISLAND